Temperament and the Development of Self-Regulation

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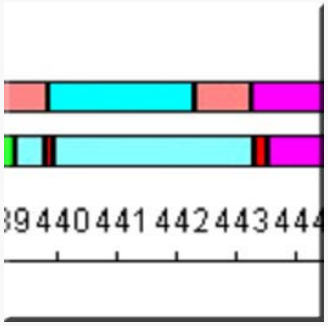
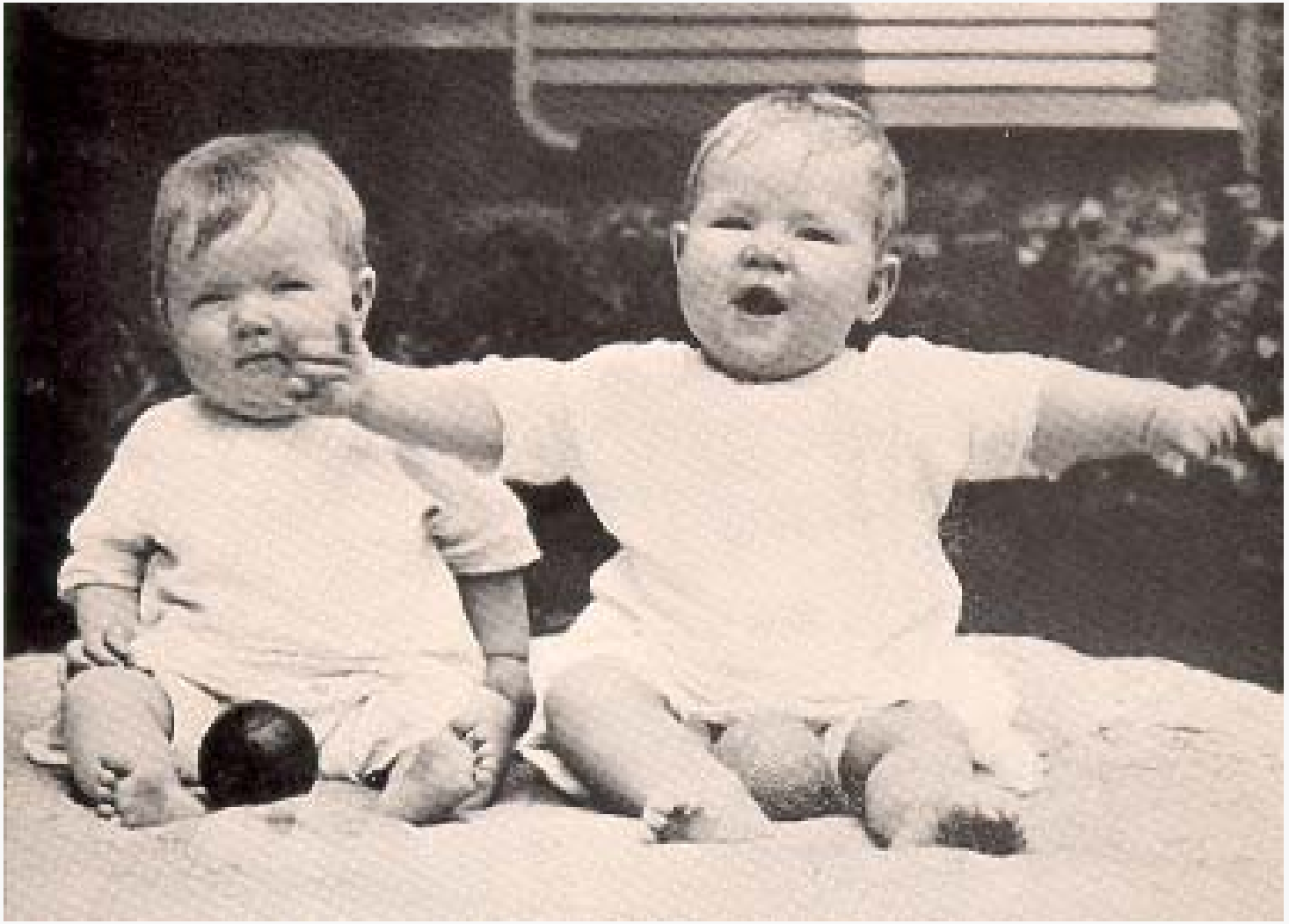




Serene Winnie & Expansive Fred at 35 Wks.

Temperament

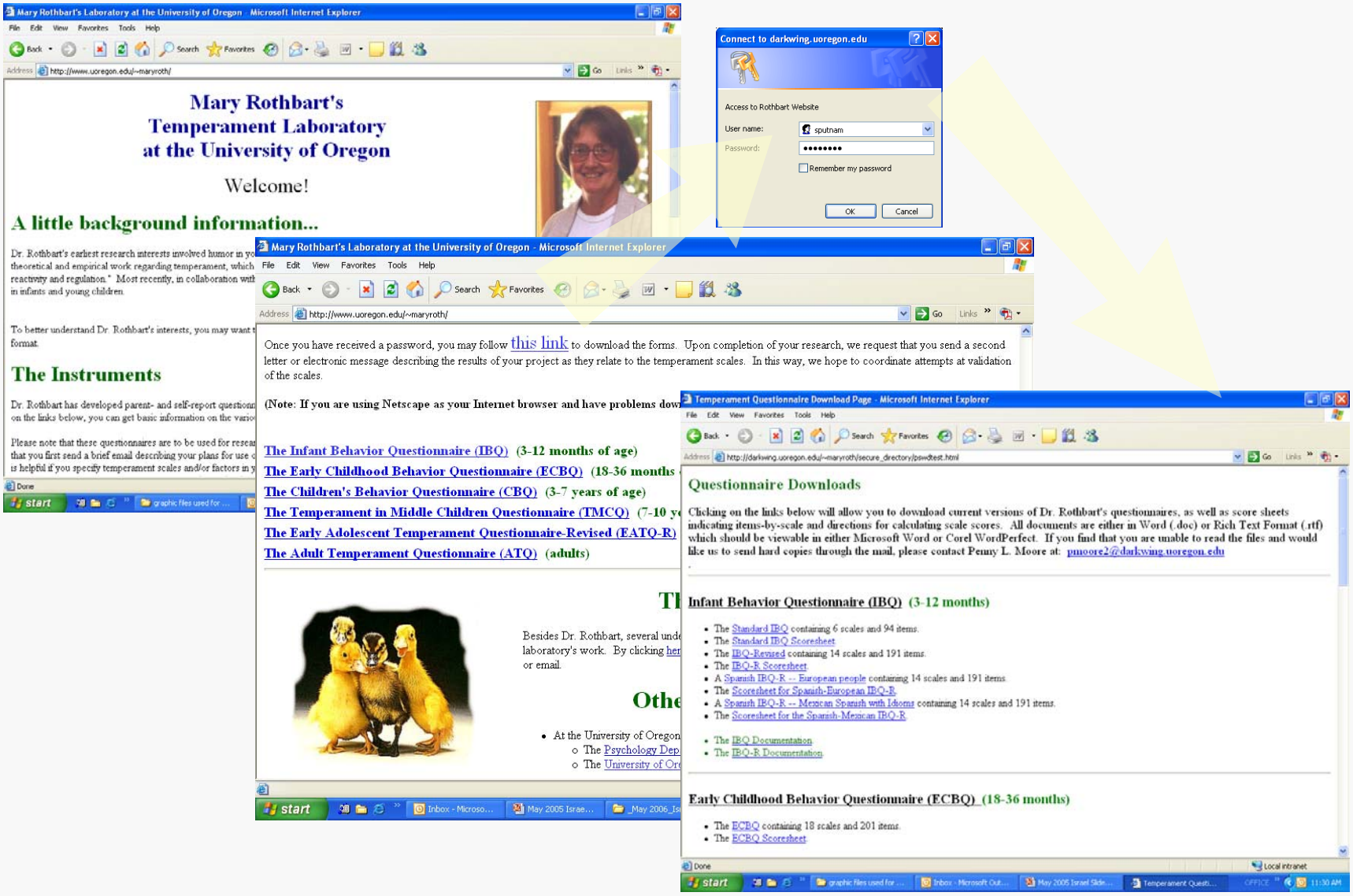
Biologically based individual differences in **reactivity** and **self-regulation**, influenced over time by heredity, maturation and experience.

- Emotional, Motor, Attentional Reactivity
- Effortful Control,Soothability Self-Regulation

These are reactive dispositions, that is, tendencies or inclinations, and self-regulative capacities.

- They are not shown continually.
- They can be influenced by the environment.
- They form the building blocks for social-emotional development.

Google “Mary Rothbart” for Questionnaire website



Children′s Behavior Questionnaire (CBQ)

Extraversion/Surgency Factor

- **Activity Level.** Tends to run, rather than walk, from room to room.
- **Smiling and Laughter.** Often laughs out loud in play with other children.
- **Positive Anticipation.** Becomes very excited before an outing (e.g. picnic, party).
- **Impulsivity.** Often rushes into new situations
- **High Intensity Pleasure.** Likes to go high and fast when pushed on a swing.
- **Shyness.(-)** Acts shy around new people.

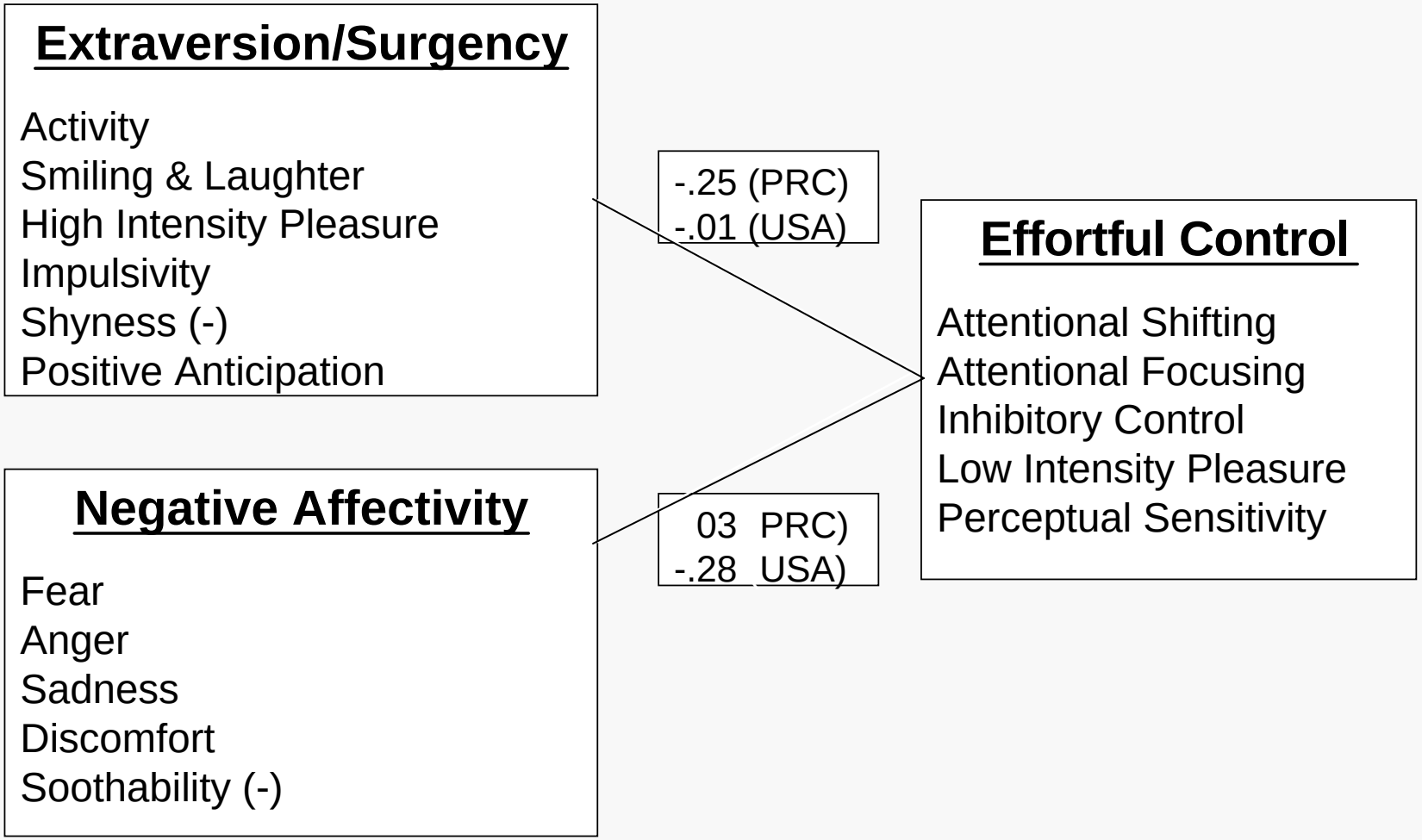
Negative Reactivity Factor

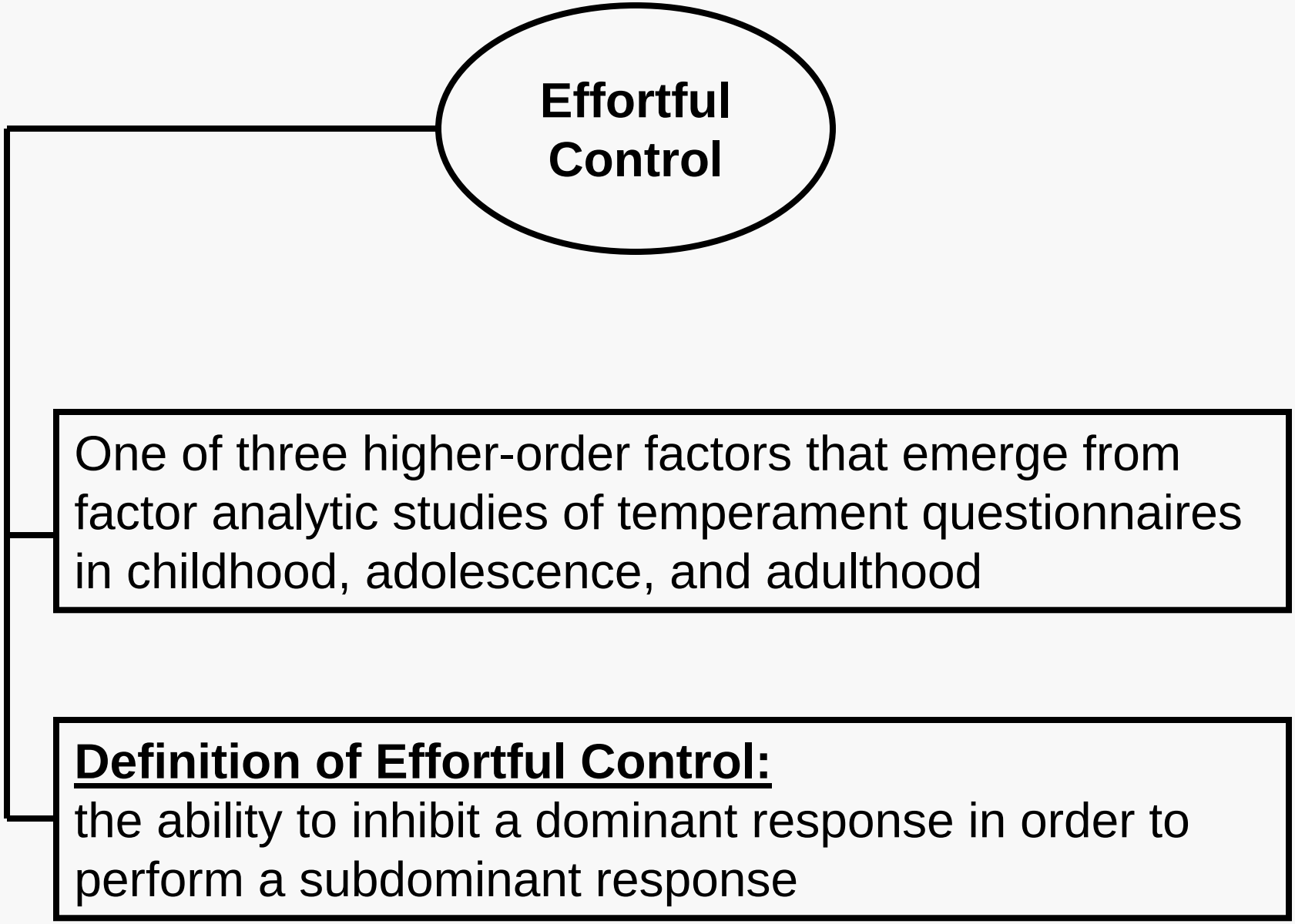
- **Anger/Frustration.** Gets angry when told s/he has to go to bed.
- **Fear**. Is afraid of the dark.
- **Sadness.** Tends to become sad if the family's plans don't work out.
- **Inhibitory Control.** Can easily stop an activity when told "No".
- **Discomfort.** Is likely to cry when even a little bit hurt.
- **Soothability. (-)** Is easy to soothe when s/he is upset.

Effortful Control Factor

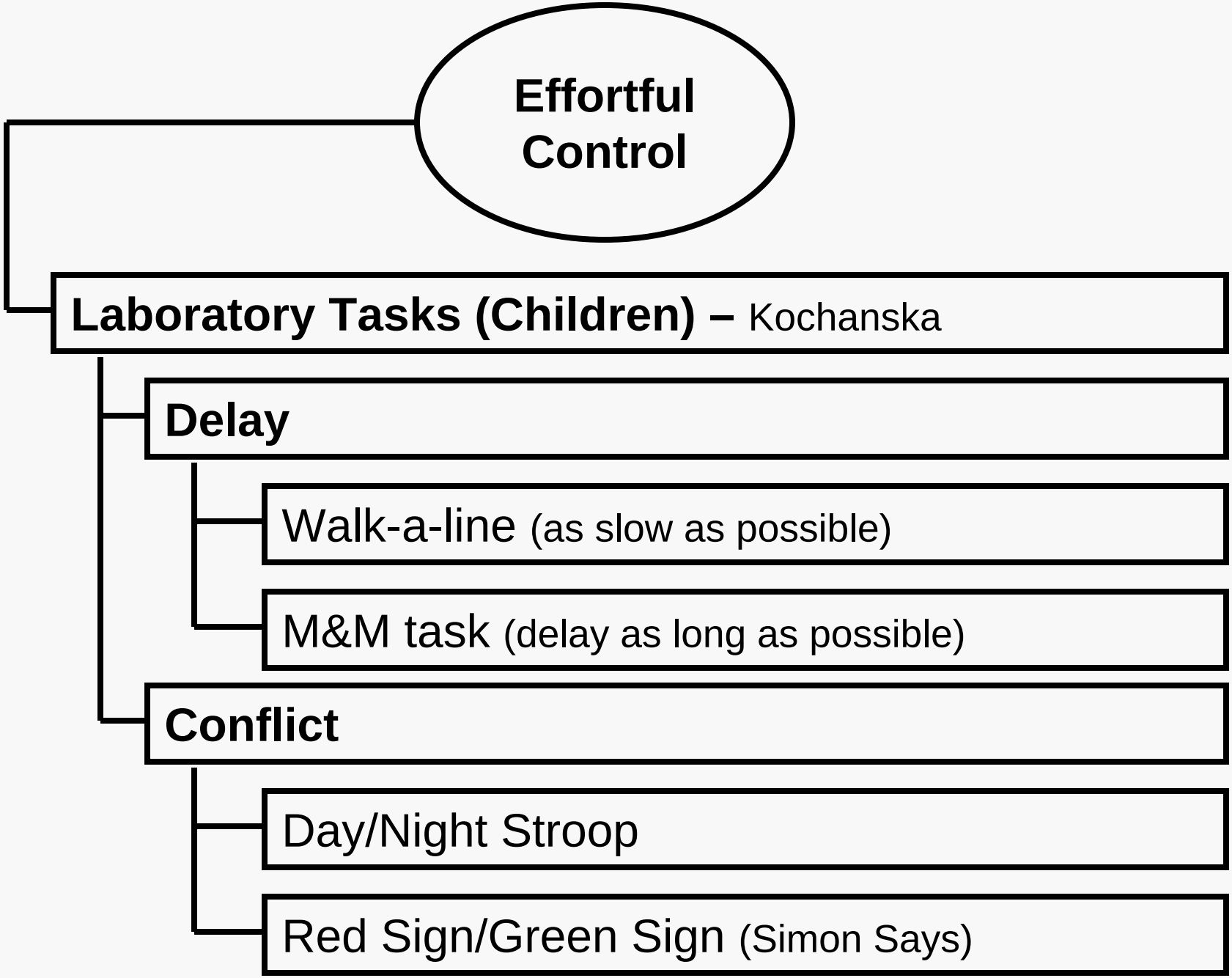
- Inhibitory Control. Can easily stop an activity when told “No”.
- Attentional Focusing. When drawing or coloring in a book, shows strong concentration
- Low Intensity Pleasure. Likes the sound of words, as in nursery rhymes.
- Perceptual Sensitivity. Notices it when parents are wearing new clothing.

Broad Dimensions of Temperament.
CBQ: 6-7 Years




Effortful Control
One of three higher-order factors that emerge from factor analytic studies of temperament questionnaires in childhood, adolescence, and adulthood
Definition of Effortful Control:
the ability to inhibit a dominant response in order to perform a subdominant response

Effortful Control


Effortful Control
Laboratory Tasks (Children) – Kochanska
Delay
Walk-a-line (as slow as possible)
M&M task (delay as long as possible)
Conflict
Day/Night Stroop
Red Sign/Green Sign (Simon Says)

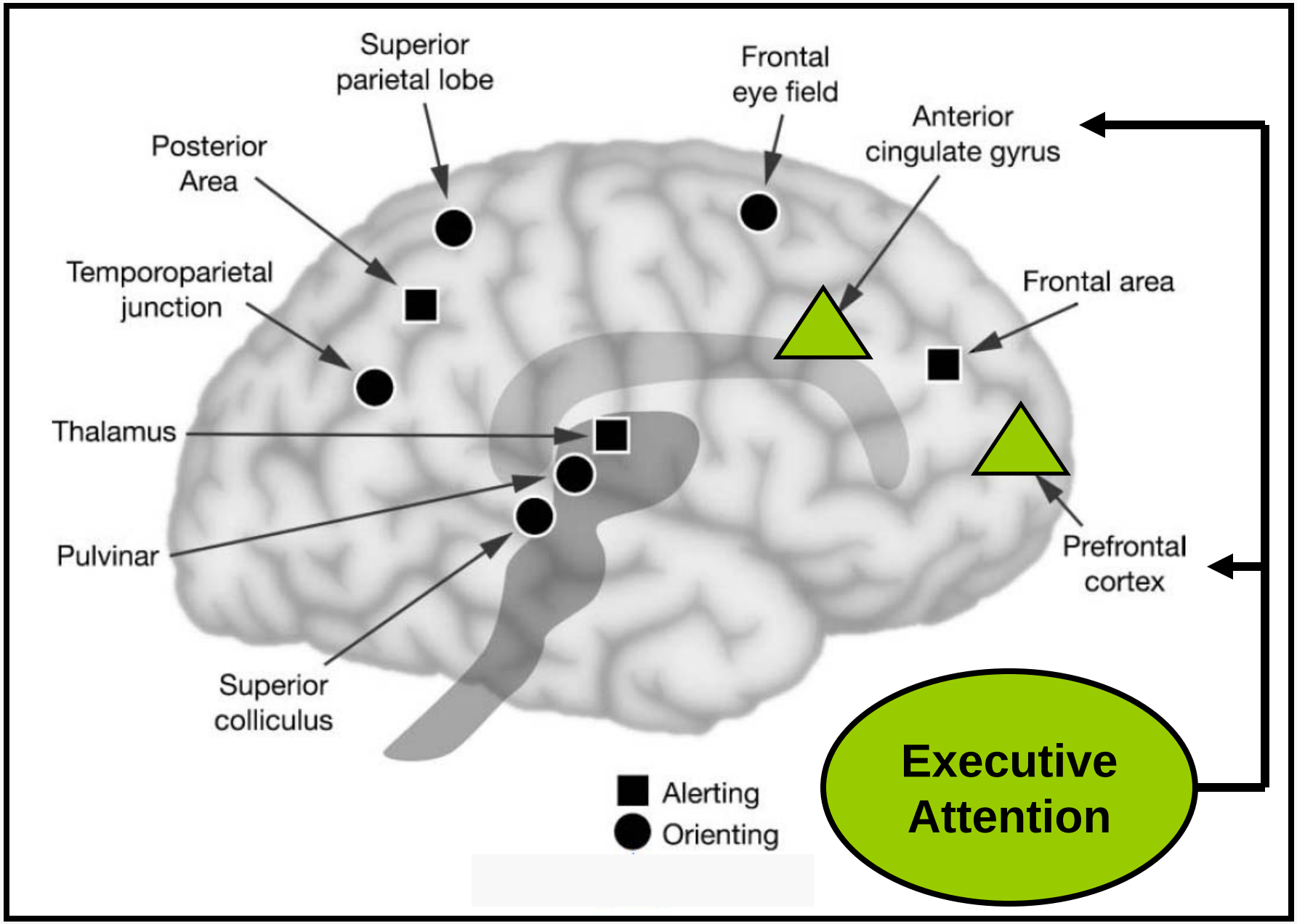
Effortful Control is Related To:

- Lower **Negative Emotionality** (Eisenberg, et. al., 2005)
- Lower **Impulsivity** (Eisenberg, et. al., 2005)
- **Smiling** to an Unwanted Gift (Kieras, et. al., 2005)
- Higher **Prosocial Behavior** (Valiente, et. al, 2006)
- Low **Externalizing Problems** (Olson, et. al., 2005)
- Low **Conduct Problems** (Loukas & Roalson, 2006)
- Low Symptoms of **ADHD** (Nigg & Casey, 2005)
- Higher **School Performance** (Valiente, et. al., 2007)
- Higher **Ego Resiliency** (Eisenberg, et. al, 2003)

Attention networks of the Human Brain (Posner & Fan, 2008)

- Alerting Network
- Orienting Network
- Executive Attention

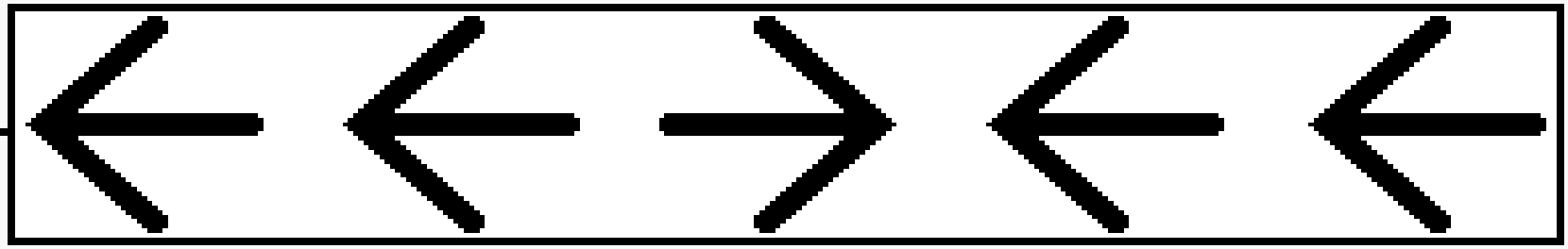
- Links between Effortful Control and Executive Attention


Superior parietal lobe
Frontal eye field
Anterior cingulate gyrus
Posterior Area
Temporoparietal junction
Frontal area
Thalamus
Pulvinar
Prefrontal cortex
Superior colliculus
Alerting
Orienting
Executive Attention

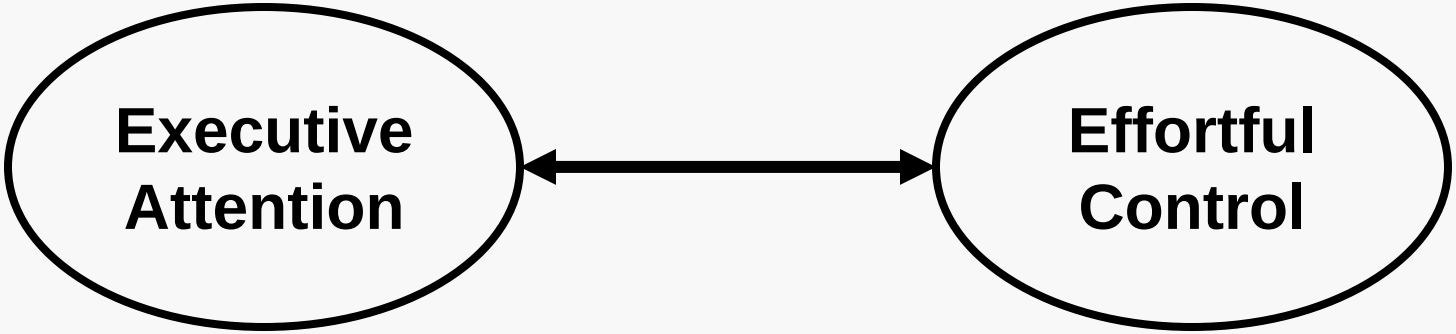
Conflict Resolution

Error Detection

Planning

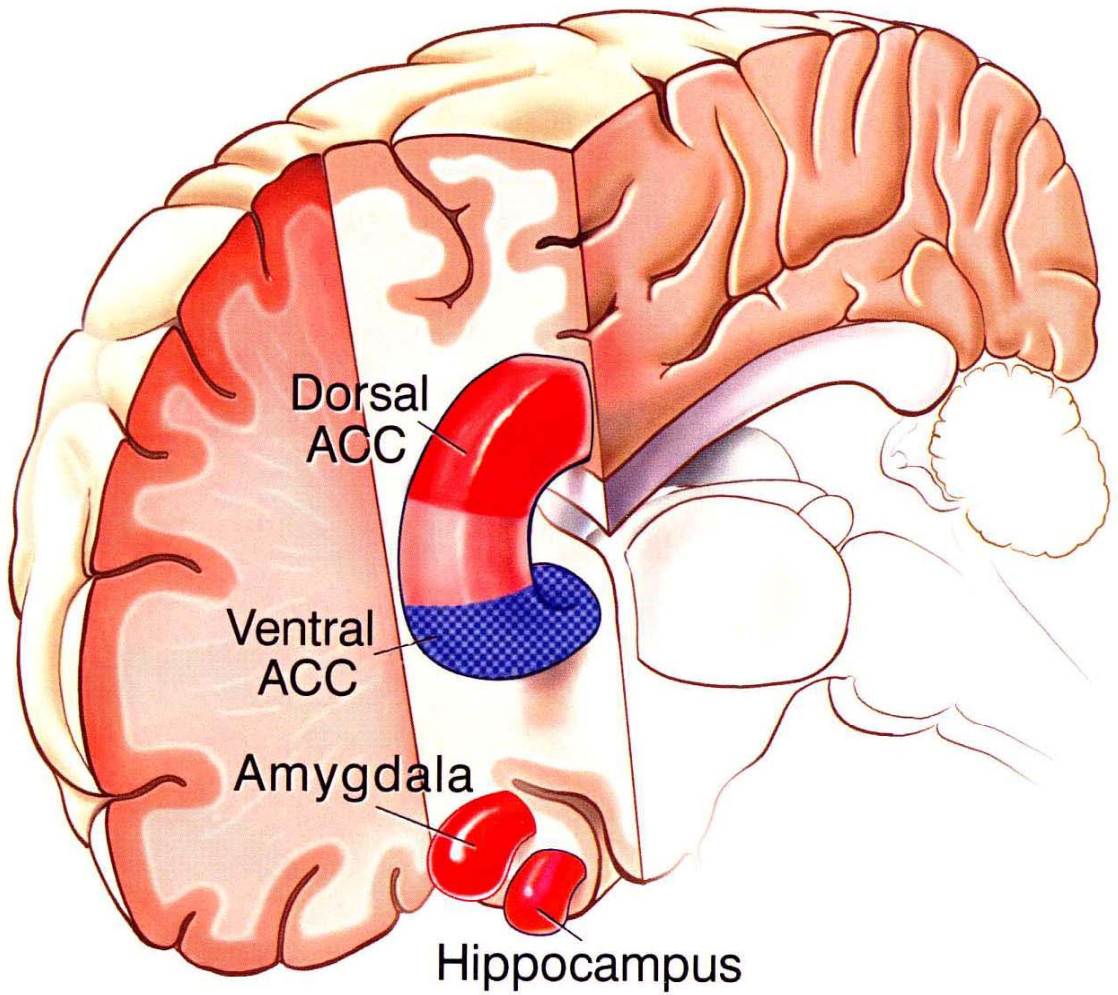


RED GREEN BLUE



Evidence linking Effortful Control (EC) and Executive Attention (EA)

- 30 months: EC ←→ Spatial Conflict (Gerardi-Caulton, 2000)
- 7 year olds: EC ←→ Stroop (Gonzales et al., 2001)
- 16 year olds: EC ←→ ANT Conflict, Stroop (Ellis, 2002)
- 13 to 16 year olds: EC ←→ Larger Volume Dorsal ACC (Whittle et al., 2006)
- 13 to 16 year olds: EC ←→ Negatively related to resting BOLD signal ventral ACC (Whittle, 2007)



(b) Effortful Control

SOLID COLOR = STRUCTURAL
HATCHED COLOR = RESTING BOLD SIGNAL
RED = POSITIVE CORRELATED WITH EC
BLUE = NEGATIVELY CORRELATED WITH EC

Attention Training

Is it possible to enhance attention through training?

Would that training modify functioning of the brain systems related to attention?

Rueda, M. R., Rothbart, M. K., McCandliss, Bruce D., Saccomanno, L., and Posner, M. I. (2005). Training, maturation, and genetic influences on the development of executive attention. *Proceedings of the National Academy of Sciences,* 102, 14931-14936.

		IQ K-BIT	Vocab Subtest	Matrices Subtest
EXPERIMENTAL GROUP 5 DAYS TRAINING	PRE	111.3	115.3	104.8
	POST	117.4	117.0	113.8
	DIFF	**+6.1**	**+1.7**	**+9.1**
CONTROL GROUP 5 DAYS CONTROLLING VIDEOS	PRE	115.4	116.3	111.4
	POST	115.8	123.1	104.9
	DIFF	**+0.4**	**+6.8**	**-6.4**

EDUCATING THE HUMAN BRAIN

MICHAEL I. POSNER & MARY K. ROTHBART

Work in Progress

- Studying the relation of temperament to specific genes and to gene-parenting interactions
- Studying the developmental origins of Executive Attention in infancy and relating their development to gene function
- Further development of Short and Very Short Forms of the Temperament Questionnaires